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REPORT

A vector map of the world's terrestrial biotic units: subbiomes, biomes, ecozones and domains

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Abstract

A vector map of biotic units encompassing the entire terrestrial area of the earth is provided. It contains a hierarchical system of domains, ecozones, biomes and subbiomes, as a large-scale description of the terrestrial ecosystems. The map can be used for different analysis, including monitoring of climate change.

Keywords

biogeography, biome, biotic unit, climate, domain, Earth, ecozone, GIS vector map, subbiome

Introduction

In a previous paper, we proposed a classification of biotic units (biomes *sensu lato*) which encompasses the entire terrestrial area of our planet and helps to explain and understand the general patterns of its biodiversity (Loidi et al. 2022). Here, we provide a digital map of these biotic units to be used for different analysis and climate change monitoring.

The map was created and used in the work on the climatic definitions of the world's terrestrial biomes (Loidi et al. 2022). It contains a hierarchic system of large biotic units: 4 domains (Cryocratic, Mesocratic, Xerocratic and Thermocratic), divided into 7 ecozones, 9 biomes and 20 subbiomes.

Description of the vector map

The map contains GIS vector layers (in a zip archive) with polygons classified to the level of subbiomes, biomes, ecozones and domains. Polygons have been drawn manually using QGIS software (QGIS Development Team 2009). Formats are as follows: GeoJSON, ESRI shapefile, Keyhole Markup Language (KML), QGIS Layer settings file. Coordinate reference system (CRS): EPSG:4326 - WGS 84; Charset Encoding: UTF-8.

The attribute table contains the following fields: **fid** (polygon id), **subbiome** (code of subbiome), **biome** (code of biome), **ecozone** (code of ecozone), **domain** (code of domain), **area_km2** (area of a polygon in km^2 in a World Cylindrical Equal Area projection, ESRI: 54034), **subbiome_n** (name of subbiome), **biome_n** (name of biome), **ecozone_n** (name of ecozone), **domain_n** (name of domain).

Distribution of the subbiomes across the world in the Mollweide projection is presented in Figure 1. Names and codes of the domains, ecozones, biomes and subbiomes are given in Table 1.

The largest subbiome of the Earth is 8b Tropical pluviseasonal forests and woodlands (21,532,324.6 km^2 or 16.2%), followed by 2a Lowland boreal Taiga (16,964,468.7 km^2 or 12.7%) and 9a Tropical rain forests (15,042,477 km^2 or 11.3%). Among the biomes, the largest is 8 Biome of the tropical pluviseasonal forests and shrublands (29,576,514.8 km^2 or 22.2%), followed by 7 Biome of the deserts and semi-deserts of arid regions (26,046,887.6 km^2 or 19.6%)

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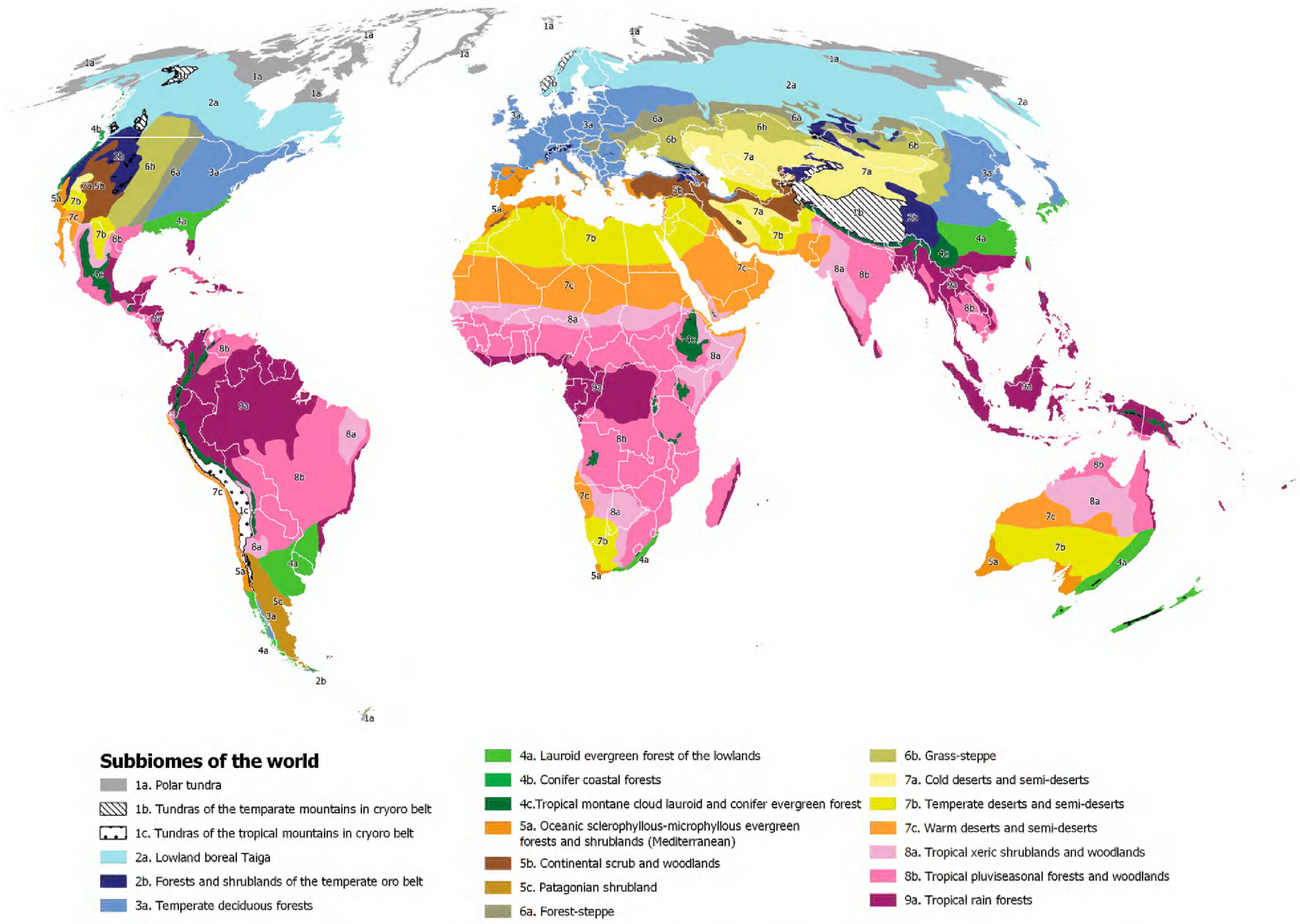

Figure 1. Distribution of the 20 subbiomes across the world (Mollweide projection) with country borders.

Table 1. Domains, Ecozones, Biomes and Subbiomes of the Earth.

Domains	Ecozones	Biomes	Subbiomes	Area in km²	Area in %
A. Cryocratic Domain of the cold climates	AA. Polar and boreal ecozone	1. Biome of the tundra	1a. Polar tundra	7918667.27	5.94401492
			1b. Tundras of the temparate mountains in cryoro belt	2538587.22	1.90554796
			1c. Tundras of the tropical mountains in cryoro belt	798810.781	0.59961393
		2. Biome of the boreal forest	2a. Lowland boreal Taiga	16964468.7	12.7340942
			2b. Forests and shrublands of the temperate oro belt	2751613.61	2.06545266
B. Mesocratic Domain of the temperate climates (incl. tropical mountains)	BA. Temperate ombroestival ecozone	3. Biome of the temperate deciduous forests	3a. Temperate deciduous forests	10545548.1	7.91583899
		4. Biome of the temperate pluvial evergreen forest, shrublands and grasslands	4a. Lauroid evergreen forest of the lowlands	4465646.76	3.35206292
			4b. Conifer coastal forests	207387.739	0.15567213
			4c. Tropical montane cloud lauroid and conifer evergreen forest	2316614.12	1.73892758
	BB. Temperate aridiestival ecozone	5. Biome of the temperate aridiestival evergreen forests and shrublands	5a. Oceanic scleropyllous-microphyllous evergreen forests and shrublands (Mediterranean)	2202248.53	1.65308096
			5b. Continental scrub and woodlands	2755406.8	2.06829995
			5c. Patagonian shrubland	1065122.51	0.79951637
	BC. Temperate hipercontinental steppic ecozone	6. Biome of the steppe	6a. Forest-steppe	2879666.73	2.16157358
			6b. Grass-steppe	5145181.96	3.86214463
C. Xerocratic Domain of the arid climates	CA. Ecozone of the deserts and semi-deserts of arid regions	7. Biome of the deserts and semi-deserts of arid regions	7a. Cold deserts and semi-deserts	5553316.37	4.16850389
			7b. Temperate deserts and semi-deserts	10136823.5	7.60903673
			7c. Warm deserts and semi-deserts	10356747.7	7.77411917
D. Thermocratic Domain of the warm climates	DA. Tropical pluviseasonal, rainy and dry seasons	8. Biome of the tropical pluviseasonal forests and shrublands	8a. Tropical xeric shrublands and woodlands	8044190.16	6.03823658
			8b. Tropical pluvisesonal forests and woodlands	21532324.6	16.1628787
	DB. Tropical pluvial, rainy all the year round ecozone	9. Biome of the tropical rain forests	9a. Tropical rain forests	15042478	11.2913841

and 2 Biome of the boreal forest (19,716,082.4 km^2 or 14.8%). On the highest hierarchical level, the main biotic units are domains. The Cryocratic Domain occupies 23.2% of the land surface, Mexocratic 23.7%, Xerocratic 19.6%, and Thermocratic 33.5%, making Thermocratic the largest domain on the Earth.

References

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Supplementary material

Supplementary material 1
Vector map biomes
Link: https://doi.org/10.3897/VCS.99167.suppl1